FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEBRUARY 2002

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604710N
PROGRAM ELEMENT TITLE: Navy Energy Program

A. (U) COST: (Dollars in Thousands)

PROJECT NUMBER & TITLE	FY 2001 ACTUAL	FY 2002 ESTIMATE	FY 2003 ESTIMATE	FY 2004 ESTIMATE	FY 2005 ESTIMATE	FY 2006 ESTIMATE	FY 2007 ESTIMATE	TO COMPLETE	TOTAL PROGRAM
R0371 Energy Conservation	5,015	3,129	5,691	5,804	5,956	6,055	6,164	CONT.	CONT.

A. (U) MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: Develop energy-efficient systems and practices for ships, aircraft, and facilities. Resulting energy efficiency gains contribute to fleet sustainability, combat capability (e.g., greater range, time on station), and reduced operating costs. Efforts include fuel use optimization aids for aircraft; existing gas turbine engine efficiency improvements, anti-fouling paints, and auxiliary systems for ships; and adaptation of renewable/alternative energy technologies to Navy facility needs. Provide engineering development, and test and evaluation support to the companion PE 0603724N Project R0829. This program and the companion PE 0603724N Navy Energy Program (ADV), support the achievement of Legislated, White House, Department of Defense (DoD), and Navy Energy Management Goals. They also address direction by the Office of the Secretary of Defense, the Secretary of the Navy, and the Chief of Naval Operations to make up-front investment in technologies that reduce future cost of operation and ownership of the fleet and supporting infrastructure. Navy is TRISERVICE lead for the implementation of renewable/alternative energy systems across DoD.

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BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604710N PROJECT NUMBER: R0371
PROGRAM ELEMENT TITLE: Navy Energy Program PROJECT TITLE: Energy Conservation (ENG)

(U) JUSTIFICATION FOR BUDGET ACTIVITY: This program is funded under ENGINEERING & MANUFACTURING DEVELOPMENT because it encompasses engineering and manufacturing development of new end-items prior to production approval decision.

(U) PROGRAM ACCOMPLISHMENTS AND PLANS:

1. (U) FY 2001 ACCOMPLISHMENTS:
   - (U) ($1,000) Aircraft: Completed conversion of Flight Optimization Routines for Energy Management (FOREM) software to WINDOWS format and developed "WINGS" database format. FOREM software in the WINGS database format is compatible with the Pre-flight Planning System (PFPS) and the Joint Mission Planning System (JMPS) software. Extended FOREM to additional aircraft (e.g. P-3C and AV-8B) and responded to fleet requested enhancements of operational software.
   - (U) ($1,451) Ships: Completed powering trial of DDG-51 retrofit stern flap, achieving fuel savings of about 8% of annual fuel consumption. SHIPALTS for retrofit of stern flaps to DDG-51, DD-963, CG-47, and FFG-7 were approved. NAVSEA is retrofitting all existing surface combatants at the rate of 25-30 ships per year. Monitored ship trials of ablative copper/cobiocide antifouling hull coatings; broadened task to include large-scale tests of copper/-cobiocide self-polishing paints; deleted from further testing those easy release and ablative copper coatings which have performed poorly. Conducted SHIPEVAL of new bleed air manifold to reduce air leakage from turbo-generators; and land-based test of online water wash system for LM2500. Designed system for variable speed drive of 1000 gpm fire pumps.
   - (U) ($2,564) Alternative and Renewable Energy Systems: Provided site specific design and support of PV/Diesel hybrid power systems for off-grid applications, including improvement of power control software algorithms. Provided design and installation support for two grid-connected systems using advanced thin-film PV modules. Designed, procured components and started integration of prototype PV/flywheel hybrid power system to investigate advanced energy storage systems. Continued development of high efficiency, low emissions, power generation system. As assigned DoD technical lead, provided all services with site-specific technology selection, and system engineering support to implement zero emission renewable/alternative power systems.

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2. (U) FY 2002 PLAN:

- (U) ($500) Aircraft: Distribute FOREM for WINDOWS (updated to WINGS database format) to fleet when development is completed for all legacy aircraft. Extend FOREM to additional aircraft, and respond to fleet requested enhancements. Replace DOS system palm-tops in use by Marines when deployed, with WINDOWS compatible palm-tops. Provide PFPS/JMPS programs with WINGS data support as requested.
- (U) ($629) Ships: Apply two best self-polishing reduced copper/cobiocide hull coatings to alternate bow and stern quarters of test ship for full scale trials. Provide accumulated life cycle management knowledge of ablative copper hull coatings to support the NAVSEA demo of 12-year hull coatings system. Conduct full-scale shipboard evaluation of gas turbine on-line water-wash system for LM2500; anti-degradation compressor blade coating and improved ceramic turbine blade track for DDA501-K17/34 turbo-generators. Procure, test and evaluate remote source lighting for hanger bay and wet well use. Demonstrate Variable Speed Drive (VSD) system for DDG-51 1000 gpm fire pumps; design VSD system for 2000 gpm pumps. Design full scale LHA/LHD stern flap. Design ducting mod to improve exhaust flow of LM2500 engine.
- (U) ($2,000) Alternative and Renewable Energy Systems: Continue site specific design and support of PV/Diesel hybrid power systems for off-grid applications. Complete commissioning of one grid-connected system using advanced thin-film PV modules. Assemble prototype PV/flywheel hybrid power system to investigate advanced energy storage technologies. Continue development of high efficiency, low emissions power generation system. As assigned DoD technical lead, provide all services with site-specific technology selection and systems engineering support to implement zero emission, renewable/alternative power systems.

3. (U) FY 2003 PLAN:

- (U) ($1,000) Aircraft: Resume joint effort with F/A-18E/F program to extend the F/A 18C/D Flight Performance Advisory System (FPAS) to the F/A-18E/F. Ensure effectiveness of methodologies and displays, optimize integration and enhance the system. Resume effort to assist the P-3C program to develop the computer to airframe interfaces

needed to automate and improve their conceptual FPAS. Continue FOREM development for additional aircraft such as MV-22, E-6A and KC-130.

- (U) ($2,691) Ships: Continue large scale trials of self-polishing reduced copper/cobiocide and other advanced technology anti-fouling hull coatings. Add second test ship painted with two best self-polishing copper/cobiocide hull coatings. Demonstrate VSD for 2000 gpm fire pumps, and develop for LM2500 cooling fan. Extend on-line water-wash and exhaust flow improvements to turbo-generators. Demonstrate anti-degradation coatings for LM2500 compressor blades. Revive DC fluorescent lighting development.
- (U) ($2,000) Alternative and Renewable Energy Systems: Continue site specific design and support of PV/Diesel hybrid power systems for off grid applications. Continue design and T&E/support of advanced PV module technology in both off grid and grid-connected applications. Complete integration and T&E of PV/flywheel hybrid power system to investigate advanced energy storage technologies. Investigate Power Electronic Building Block (PEBB) in inverters for power systems. Continue development of high efficiency, low emissions power generation system. As assigned DoD technical lead, provide all services with site-specific technology selection, and systems engineering support to implement zero emission, renewable/alternative power systems.

B. (U) PROGRAM CHANGE SUMMARY

	FY 2001	FY 2002	FY 2003
(U) FY 2002 President's Budget:	5,480	3157	
(U) Adjustments from PRESBUDG:			

FY 2003 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET DATE: FEBRUARY 2002

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PROGRAM ELEMENT TITLE: Navy Energy Program PROJECT TITLE: Energy Conservation (ENG)

(U) Execution Adjustment	-390		
(U) SBIR Adjustment	-75		
(U) Energy R&D Program Restoral			
(U) Section 8123 Reduction		-28	
(U) FY 2003 President's Budget Submission:	5,015	3,129	5,691

(U) CHANGE SUMMARY EXPLANATION:

(U) Schedule: Not applicable.

(U) Technical: Not applicable.

C. (U) OTHER PROGRAM FUNDING SUMMARY: Not applicable.

(U) RELATED RDT&E:

(U) PE 0601153N (Defense Research Sciences)
(U) PE 0603513N (Shipboard Systems Concept Development)
(U) PE 0603573N (Advanced Surface Machinery Systems)
(U) PE 0603721N (Environmental Protection)
(U) PE 0603724N (Navy Energy Program (ADV))
(U) PE 0604221N (P-3 Modernization Program)
(U) PE 0604231N (Tactical Command Systems)

D. (U) SCHEDULE PROFILE: Not applicable.

FY 2002 RDT&E,N PROGRAM ELEMENT/PROJECT COST BREAKDOWN DATE: FEBRUARY 2002

BUDGET ACTIVITY: 5 PROGRAM ELEMENT: 0604710N PROJECT NUMBER: R0371
PROGRAM ELEMENT TITLE: Navy Energy Program (ENG) PROJECT TITLE: Energy Conservation (ENG)

A. (U) PROJECT COST BREAKDOWN: ($ in thousands)

Project Cost Categories	FY 2001	FY 2002	FY 2003
Engineering Development & Testing	5,015	3,129	5,691